

Risk Governance of Financial Institutions in the European Union

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Abstract:

This paper investigates the determinants of risk governance practices at financial institutions in the EU. Using hand-collected data on a sample of 54 banks and 33 insurance companies, we find that risk governance practices are stronger in banks than in insurance companies, more advanced in common law countries (UK and Ireland) and less well developed in Napoleonic countries (Benelux, France, Spain, Italy), and influenced by the corporate governance characteristics of the corporation. More specifically, institutions with powerful owners (>20%) tend to give more power to the board in setting up the risk framework but report weaker risk controls, and institutions with more independent boards report stronger risk controls while giving less autonomy to the risk committee.

1. Introduction and motivation

“Many of the problems leading to our economic crisis can be laid at the door of poor corporate governance. Too many boards failed in their primary function of diligently overseeing management. As a result, too many managers took on too much risk and made decisions that were too focused on the short-term.”

SEC chairman, Mary L. Schapiro, Address to Transatlantic Corporate Governance Dialogue — 2009 Conference

“The financial crisis can be to an important extent attributed to failures and weaknesses in corporate governance arrangements which did not safeguard against excessive risk taking in a number of financial service companies.”

OECD report (Kirkpatrick, 2009)

Risk management failures in financial institutions across the US and Europe have been widely attributed to weaknesses in corporate governance (Becht et al, 2011; Mehran et al, 2012). Today’s macro-economic environment demands effective corporate governance arrangements that enable boards to adequately oversee the company’s risk management practices. How risk is governed is indeed a major issue for large corporations. At any time, boards need to be able to fully appreciate both the risk that the firm is taking and the efficiency and effectiveness of the risk management systems in place. This research focuses on the determinants of risk governance, and more specifically on the effect of corporate governance structure on risk governance practices in banks and insurance companies across the EU. Risk governance refers to *“the subset of corporate governance decisions and actions that ensure effective risk management, including cohesive policies, guidance, processes and decision-rights within the area of risk”* (IFC, 2012). Examples of risk governance practices include the presence of a Chief Risk Officer in the Board of Directors, dedicated risk committees at board level, and the formal specification of risk appetite. We analyse how corporate governance characteristics, such as ownership structure (Erkens et al., 2012, Laeven and Levine, 2009; Bonin et al., 2005) and board composition (Minton et al., 2014; Pathan and Faff, 2013; Adams and Mehran, 2012), affect the risk governance practices of financial institutions. Research questions include: How is risk governance affected by the presence of powerful owners, and

by state ownership? Do financial institutions set up more efficient and effective risk governance mechanisms when a larger number of board members are independent?

These questions are of particular interest for three reasons. *First*, risk is a critically important issue for financial institutions and their regulators as banks and insurance companies are in the business of taking on risks. In addition, weaknesses in banks' governance and risk management functions have been identified as key causes of the recent financial crisis. A number of European regulations, guidelines, and principles for financial institutions have been formulated by the Basel Committee on Banking Supervision (2014)¹, the European Banking Authority (2011)², the Financial Stability Board (2013)³ the OECD (2014)⁴ and the EIOPA (2015)⁵, with a particular emphasis on risk governance. Whereas regulations such as Basel III and Solvency II set broad guidelines for banks and insurance companies, our research seeks to explain the diversity in actual risk governance practices.

The *second* motivation is a gap in the academic literature, despite the practical relevance of the subject. An extensive body of literature (Iqbal et al., 2015; Minton et al., 2014; Wang and Hsu, 2013; Pathan and Faff, 2013; Adams and Mehran, 2012; Erkens et al., 2012, Beltratti and Stulz, 2012; Fahlenbrach and Stulz, 2011; Cornett et al., 2010; Laeven and Levine, 2009; De Andres and Valledelgado, 2008; Byrd et al., 2001) has studied the effect of corporate governance characteristics on the performance of financial institutions (arrow 3 in Figure 1 below). In contrast, very few studies (Ellul and Yerramilli, 2013; Aebi et al., 2012) focus on the specific effect of risk governance on performance and risk taking (arrow 2) and on the relationship between corporate governance characteristics and risk governance practices in the financial sector (arrow 1). Whereas some authors have studied the antecedents of Enterprise Risk Management (ERM) quality, mostly in non-financial companies (with the exception of Baxter et al, 2013), to our knowledge there are no studies that zoom in specifically on the determinants of board risk oversight in the financial sector.

¹ Basel Committee on Banking Supervision, 2014. Corporate governance principles for banks.

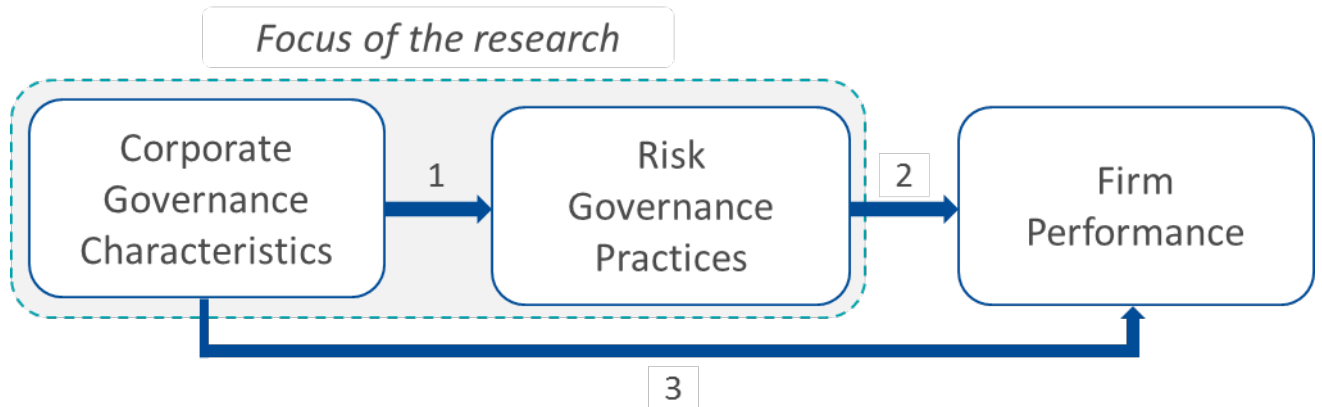
² European Banking Authority, 2011. EBA guidelines on Internal Governance.

³ Financial Stability Board (FSB), 2013. Thematic Review on Risk Governance

⁴ OECD, 2014. Risk Management and Corporate Governance, OECD Publishing.

⁵ EIOPA, 2015. Final Report on Public Consultation No. 14/017 on Guidelines on system of governance

Figure 1: Risk governance research



Third, existing evidence on the governance-performance link at financial institutions provides mixed results. For example, the link between board size and bank performance is found to be positive in Adams and Mehran (2012), negative in Pathan and Faff (2013), and with an inverted U-shape in De Andres and Valledelgado (2008). The effect of board independence on bank performance is also unclear: Pathan and Faff (2013) and Erkens et al. (2012) find it to be negative, while Byrd et al. (2001) and Cornett et al. (2009) conclude that the effect is positive. The way in which corporate governance characteristics, such as board size and board independence, but also other factors such as board financial expertise, affect the risk governance practices of financial institutions may help clarify these inconclusive findings.

We conducted a quantitative analysis based on a sample of 54 banks and 33 insurance companies in the European Union using public data hand-collected from annual reports, risk committee charters and *Bankscope*, *Datastream* and *Orbis* databases. Companies are selected based on their recorded total assets (with a focus on the largest). Risk governance practices for the banks and insurance companies in our sample are documented based on a predefined set of variables derived from prior research (e.g., the presence and role of the Chief Risk Officer and of a board-level risk committee; Ellul and Yerramilli, 2013; Aebi et al., 2012). Two years of data are analysed, 2007 (before the financial crisis) and 2014 (after the financial crisis).

Our research contributes to the academic literature in two ways. First, we analyze the influence of corporate governance characteristics, such as ownership structure and board composition, on risk governance in the pre-crisis *and* post-crisis period. No existing study, as far as we know, is taking the post-crisis period into account. Second, our study includes both banks and insurance companies. This latter group of financial institutions has been largely neglected when it comes to studying their risk governance practices.

In addition to our contributions to the academic literature, this research also provides relevant practical insights for banks and insurance companies, as they can learn how risk governance practices and frameworks are put in place by their industry peers across the EU. Moreover, our research is important for regulatory authorities, who need to keep track of how their guidelines are interpreted and applied in practice.

We find that risk governance practices -1- are stricter in banks than in insurance companies, -2- they are more advanced in common law countries (UK and Ireland) and less well developed in Napoleonic countries (Benelux, France, Spain, Italy), -3- they are influenced by the corporate governance characteristics of the corporation. More specifically, institutions with powerful owners (>20%) tend to give more power to the board in setting up the risk framework but report weaker risk controls, and institutions with more independent boards report stronger risk controls while giving less autonomy to the risk committee.

2. Literature Review

2.1. The specificity of corporate governance in the financial sector

This paper focuses on the financial sector for several reasons. First, the corporate governance of financial institutions needs to be studied separately from other sectors. As argued by Levine (2004), Hopt (2013), and Himaj (2014), governance at financial institutions differs considerably from non-financial companies because its scope goes beyond the shareholders to include a broader range of stakeholders, including debtholders, insurance policy holders and other creditors. In addition, the business of banks is characterized by a high degree of opacity and complexity, which makes it harder to monitor their activities (Becht et al, 2011). Moreover, banks are subject to stricter regulations and supervisory requirements, especially with regard to risk management (Hopt, 2013). It is the regulators' responsibility to ensure a secure and

stable financial system that supports economic growth with minimal disruption. These unique features complicate both the role of the board and the effectiveness of its governance.

Secondly, financial institutions play an important economic role, as notably testified during the financial crisis. The corporate governance of banks has been argued to act as an instrumental determinant for economic development and growth (Himaj, 2014; Levine, 2004). While banks are often the main focus in financial studies, insurance companies should also be considered as major players. For similar reasons as in banking, corporate governance in these organizations is economically important and specific. In terms of assets under management, insurers indeed have significant economic impact. In this perspective, it is even argued that with Basel III and Solvency II, insurance companies may “replace” banks in their role of long term funding of the economy (Thibeault and Wambeke, 2014). Despite these arguments, the academic literature seems to ignore the specificities of corporate governance in insurance.

Overall, it is therefore crucial to properly understand the effects of corporate governance in the financial world not only from the perspective banks and insurance companies themselves, but also for the whole economy, as these institutions are major players in terms of assets under management.

2.2. The importance of the institutional environment

Corporate governance structures and mechanisms depend on the institutional environment of the firm. The existing literature indeed emphasizes the fact that different governance structures are observed in different countries because of differences in the legal context. More specifically, Ferreira et al. (2012) find that country characteristics explain most of the cross-sectional variation in bank board independence. La Porta et al. (2000) conclude that common law (i.e., the Anglo-American model of corporate governance) provides stronger protection for the shareholders than other countries. Solomon & Solomon (2004) highlight that civil law countries (i.e., the Continental European model of governance) tend to ensure a balance of the interests of a variety of key stakeholder groups, such as employees, managers, creditors, suppliers, customers and the wider community.

2.3. The effect of corporate governance on firm performance and risk-taking in the financial sector

While this paper considers corporate governance characteristics as determinants of risk governance, this section reviews how these characteristics affect firm performance. The existing literature on the governance-performance link in the financial sector has focused on different aspects of corporate governance, including board structure (i.e., board independence and size), human capital (i.e., the experience and expertise of directors and management), ownership structure, and broad governance indices.

2.3.1. Board structure: independence and size

Potential weaknesses in board composition and competence have been widely debated in the context of the economic crisis and the failure of risk oversight in some financial institutions (Kirkpatrick, 2009). Concerning the effect of board independence and board size, the majority of publications are based on a US sample, some use the EU context, some others focus on one country, and some employ international samples (up to 30 different countries in one sample in Erkens et al. (2012) for instance). It is therefore difficult to make generalizations on this basis because of comparability issues. Moreover, performance is not always measured using the same indicators. Existing studies focus on either risk taking, crisis performance, loan performance or stock performance, such that the issue of comparability is exacerbated.

Overall, the effect of board characteristics on performance in the financial sector appears unclear. For board size, Adams and Mehran (2012) find a positive effect on bank performance with a US sample, while Pathan (2009) and Pathan and Faff (2013) find a negative effect with respectively US and EU samples; De Andres and Valledelgado (2008) observe an inverted U-shape relationship on an international sample (Canada, France, UK, Italy, Spain and US). Concerning board independence, Brewer et al. (2000), Byrd et al. (2001), Cornett et al. (2010), Rowe et al. (2011) find a positive effect on performance, while Erkens et al. (2012) and Pathan and Faff (2013) find a negative effect.

Overall the effect of board structure on firm performance is unclear. Our investigation of how risk governance practices differ depending on the board structure will provide additional insights in this respect.

2.3.2. Human capital of directors and management

While traditional wisdom of corporate governance emphasizes the importance of independent non-executive directors (NEDs), the financial crisis and recent empirical studies show that the qualification and experience of bank board members is at least as critical. The complexity and opacity of financial institutions and the increased challenges in monitoring these complex institutions, require appropriate expertise on the part of the board of directors and risk committees in particular. With respect to the effect of human capital on the performance of financial institutions, board competence is found to be positively related to performance, with board “incompetence” leading to poor performance (Cunat and Garicano, 2009; Hau and Thum, 2009). In particular, the financial experience/expertise⁶ of directors is a topic of interest in the literature, with the general assumption being that board members should be individuals with sufficient financial expertise to have a clear perspective on the company’s risk issues. However, the effect on performance is unclear from existing empirical studies. Minton et al. (2014) find a negative relationship with crisis performance and also find evidence of a heightened risk profile for banks with more experienced directors. In contrast, Fernandes and Fich (2009) observe a positive link between board expertise and crisis performance.

Besides the broad-based expertise of the board-level risk committee, prior studies have also emphasized the expertise of individuals occupying key risk management roles, in particular the Chief Risk Officer (CRO), as a key determinant of risk governance. Bailey (2015) found that CRO expertise – but not risk committee expertise – was significantly and positively related to ERM quality in the insurance industry, and both variables were associated with favorable risk outcomes for the firm (i.e., lower levels of total risk, strategic risk and internal control risk).

⁶ The terms “experience” and “expertise” are used interchangeably in this paper.

2.3.3. Ownership structure

This research seeks to analyze how risk governance mechanisms differ depending on the type of ownership structure. Prior research has predominantly focused on the effect of ownership structure on bank performance and risk taking (Jensen and Meckling, 1976). Grigorian and Manole (2002), Fries and Taci (2004) and Bonin et al. (2004) show that, in transition countries, foreign ownership improves bank efficiency. Bohren and Josefsen (2007) find that, in the Norwegian banking sector, ownerless firms take on less risk than stockholder-owned firms. Laeven and Levine (2009) find that banks with more powerful owners tend to take greater risks, while Erkens et al. (2012) find that firms with higher institutional ownership took more risk prior to the crisis and experienced worse stock returns during the crisis period. Iannotta et al. (2007) find that when accounting for bank characteristics, country and time effects, government-owned banks and mutual banks exhibit a lower profitability than privately owned banks, in spite of their lower costs. However, to our knowledge, there is no research that focuses on the effect of ownership structure on the risk governance practices of financial institutions.

2.3.4. Governance indices

Corporate governance indices have also been explored as potential determinants of firm performance in the financial industry. Different indicators have been used in prior research, including the GIM index, the Corporate Governance Quotient from *RiskMetrics*, and the board effectiveness index of Faleye and Krishnan (2010), which is the sum of board size, independence, staggered elections, CEO-chair duality criteria. Overall, the effect on bank performance seems to be negative as testified in Aebi et al. (2012), Beltratti and Stulz (2012), Iqbal et al. (2015), although one study finds a positive effect (Faleye and Krishnan, 2010).

2.4. Risk governance literature review

Although risk governance is an important topic from a practitioner point of view, it received relatively little attention in academic studies. In the practitioner-oriented literature, for example, Mongiardino and Plath (2010) show that the risk governance in large banks after the crisis has improved only to a limited extent despite increased regulatory pressure. The authors outline best risk governance practices and notice that only a small number of banks were

following these practices in 2007. However, while the importance of the CRO as well as risk governance in general has been emphasized in the media, regulatory documents and practitioner-oriented reports, it remains somewhat underdeveloped in the academic literature, with a few notable exceptions.

Aebi et al. (2011) used hand-collected data on 372 US banks for the year 2006 and looked at 5 governance criteria: whether the CRO is in the executive board, whether the bank has a risk committee, board size, the percentage of independent board members, and the percentage of directors with a finance background. For a sub-group of 86 banks, they also examined the number of risk committee meetings, the number of directors in the risk committee, whether the CRO reports to the board of directors, and whether the CRO reports to the CEO. They concluded that banks where the CRO reports to the board, perform significantly better in the credit crisis, and that banks where the CRO reports to the CEO, perform significantly worse.

Ellul and Yerramilli (2013) studied a sample of 72 US banks from 1994 to 2009 and looked at 4 dimensions of CRO importance: whether a CRO is present, whether the CRO is an executive, whether the CRO is among the five highest paid executives, and the CRO's compensation compared to CEO compensation. The quality of risk oversight was assessed with 2 indicators: whether risk committee members have financial experience, and whether the committee meets more frequently than the sample average. On this basis they derived a "Risk Management Index" (RMI) using principal component analysis. Ellul and Yerramilli (2013) found that US banks with stronger risk controls before the crisis perform better and that a strong independent risk management function can reduce risk exposure at banks.

Lingel and Sheedy (2012) built on Ellul and Yerramilli (2013)'s research and investigated the influence of risk governance characteristics on firm risk (measured as equity returns) using a sample of the 60 largest financial institutions in *Datastream* (in terms of total assets) from 2004 to 2010. The authors identified the following determinants of risk outcomes: inclusion of the CRO in the senior executive team, CRO ranked in the Top 5 paid executives, the activity of the Risk Committee, and the proportion of experienced bankers on the Risk Committee. They found that stronger risk governance leads to lower risk.

Magee et al. (2014) studied the effect of risk governance in the insurance sector during the financial crisis. The authors analyzed the effect of the existence of a CRO, risk committee characteristics and board industry experience. They concluded that firms with a higher risk governance index perform better.

Among the academic studies that relate to risk governance, we can also mention the work of Baxter et al. (2013) who examined Enterprise Risk Management (ERM) schemes as an internal mechanism that firms can use to align shareholders' and managers' interest. Their research employed a sample that included both banks and insurance companies. They found that larger and more diversified entities have higher ERM quality, while riskier companies have lower ERM quality. In addition, higher quality ERM was associated with better corporate governance, less audit-related risk, presence of risk officers/committees, and boards with longer tenure. The authors further showed that ERM quality is positively related to operating performance.

3. Methodology

3.1. Sample selection

We select a sample of 54 banks and 33 insurance companies (See Appendices 3 & 4 for the complete list of banks and insurance companies). The list of banks, ranked by total assets, was extracted from the *Bankscope* database, followed by a rigorous selection procedure to obtain a representative sample of major financial institutions in Europe. Panel A of Table 1 provides the details of the selection criteria that were used in this respect. Insurance companies were selected based on the *Relbanks* list of largest insurance companies in Europe in terms of total assets.

With respect to the sample selection criteria in Table 1, it is important to highlight that we focused on EU15 countries, but also included Switzerland and Norway in the analysis because of these countries' economic importance in the financial landscape of the Eurozone. We restricted our sample to include a maximum of 5 banks and 5 insurance companies per country. This constraint led us to exclude a significant number of financial institutions (mainly

from the UK, France, Germany and Italy), but allowed us to get a sample that is representative of all EU15 countries, and not only the ones with the most developed financial systems.

Table 1. Sample selection**Panel A: Banks**

Selection criteria	Number of observations	
	included	excluded
Total Bankscope universe in year 2014	20,708	
Only at C2 consolidation level (<i>statement of a mother bank integrating the statements of its controlled subsidiaries or branches with an unconsolidated companion</i>)	2,406	18,302
Only active banks (<i>as opposed to bankruptcy, dissolved, in liquidation, inactive, unknown</i>)	2,388	18
Only EU15 countries + Switzerland + Norway	639	1,755
Exclude non-banking entities:		
<ul style="list-style-type: none"> • <i>Include</i>: Bank Holding & Holding Companies, Commercial Banks, Cooperative Banks, Investment Banks, Islamic Banks, Private Banking & Asset Management Company, Real Estate and Mortgage Banks, Savings Banks 	517	
<ul style="list-style-type: none"> • <i>Exclude</i>: Central Banks, Clearing Institution & Custody, Finance companies (credit card, factoring & leasing), Group Finance Companies, Investment & Trust Corporations, Micro-Financing Institutions, Other non-banking credit institutions, Securities Firm, Specialized governmental Credit Institution 		122
Rank firms by their total assets (all converted in \$) and select the first 50 banks, applying the following rules:	54	
<ul style="list-style-type: none"> • Delete when total assets are recorded in thousands (instead of millions) • When 2 banks belong to the same group, keep the holding entity only • Maximum of 5 banks per country • Annual reports should be available back until 2006 • The bank is listed in an EU country but is not an EU bank • The bank uses different accounting standards than IFRS • The bank should not be merged or founded after 2006 • No more than 50% missing data 		28 35 40 9 1 1 11 2

Panel B: Insurance Companies

We use the *Relbanks*⁷ list of largest insurance companies in Europe in terms of total assets, and apply the same criteria, if applicable, as above (only EU15 countries + Switzerland + Norway, annual reports available, maximum 5 observations per country).

⁷ Relbanks is an organization which is not associated or affiliated with any Bank, Asset Management or Government Agency. The data used to produce rankings is based on annual reports and financial statements of the companies. www.relbanks.com

3.2. Variables

Each bank and insurance company in our sample was evaluated on a set of assessment criteria that are detailed in this section. We looked into the annual reports, risk reports, pillar 3 reports/disclosures, risk committee charters and corporate governance charters for every company. For some criteria that relate to the expertise of the CRO or members of the risk committee, we also looked for any background information he could find on the Internet (LinkedIn, Who's who,...).

All variables can take one of the following values:

- 0/1 for dummy variables or % for variables like "board independence"
- "NA" for variables which are not-applicable in some specific cases (e.g., when there is no CRO, all CRO-related variables become NA)
- "." for missing values (the information is not available)

All criteria that relate to risk governance (i.e., the dependent variables) are measured in the years 2014 and 2007 (pre- and post-crisis), while the variables that relate to corporate governance (i.e., the independent variables) are measured in the years 2013 and 2006. This allows to use lagged variables in the regression analysis, and partially control for endogeneity concerns.

The assessment criteria can be categorized in 5 groups: CRO variables, risk committee variables, risk variables, corporate governance variables and control variables. Appendix 1 provides a summary of all variables.

3.2.1. CRO variables

3.2.1.1. *Presence of a CRO*

This variable indicates whether the firm has a Chief Risk Officer (CRO) or another equivalent function. In the annual reports and other official publications, the CRO can be specified with similar titles such as Chief Governance Risk Officer, Group Risk Officer, Head of Group Risk Management, Chief Risk Director, Risk Director, Head of Group Risk Control, Risk Officer, Group Risk Officer or Member of the management board, responsible for risk controlling.

3.2.1.2. *CRO expertise*

CRO expertise is divided into 5 sub-categories, specifying the education level and the supervisory, financial, industry and risk expertise of the CRO, as inspired by Bailey (2015). The education level variable assesses whether the CRO holds an MBA or a doctorate. The supervisory expertise variable indicates whether the CRO has prior experience as a CEO or equivalent. The financial experience variable indicates whether the CRO has prior experience as certified public accountant, CFO, VP finance, controller or any other major accounting position. The industry expertise variable indicates whether the CRO has prior experience in banking, either as an employee or a board member. The risk expertise variable indicates whether the CRO has prior experience in a similar role: as CRO, VP risk management or similar high level risk management position.

3.2.1.3. *CRO power*

The status and weight of the risk function plays an important role in the effectiveness of risk governance at board level (Kirkpatrick, 2009). CRO power is evaluated across 3 sub-categories, successively evaluating whether the CRO is a member of the board of directors, whether there is dual hatting (i.e., whether he/she simultaneously holds another chief officer function such as CEO, CFO, COO,...), and whether the CRO has cross-directorships (i.e., he/she is simultaneously part of the board of directors of another financial institution). For the cross-directorship variable, we used both hand-collected data and the *Orbis* database.

3.2.2. Risk committee variables

3.2.2.1. *Presence of a risk committee*

This variable indicates whether the firm has a board-level risk committee, i.e., a committee that is responsible for managing overall risk and has board-level risk oversight.

3.2.2.2. *Risk committee expertise*

Similarly, as the CRO expertise criteria, the assessment of the risk committee expertise is divided into different sub-categories, evaluating the supervisory, financial, industry and risk expertise of the risk committee. The variables indicate whether at least one member of the

risk committee has supervisory, financial, industry or risk experience, based on the same definitions as for the CRO expertise variables.

3.2.2.3. *Risk committee independence*

The independence of the risk committee is assessed based on different aspects: the percentage of independent members on the risk committee, the autonomy of the risk committee (i.e., whether it is merged with another committee), whether the CRO is part of the committee, and whether he/she attends the risk committee meetings.

3.2.3. Risk management variables

The regulatory authorities advocate that a financial institution “*should have a holistic risk management framework extending across all its business, support and control units, recognizing fully the economic substance of its risk exposures and encompassing all relevant risks.*” (EBA 2011). According to the FSB (2013), effective risk governance is based on “a well-designed and articulated firm-wide risk management framework, which reflects the firm’s risk culture, enumerates the firm’s risk profile, and ensures that the risk limits (...) are not breached”. An institution's risk management framework includes its risk policies, procedures, limits and controls. The risk framework characteristics of the sample firms included in this research relate to the following dimensions:

- Whether both quantitative and qualitative risks are assessed;
- Whether reputational risk is considered: this variable indicates whether reputational risk is specified in the list of risks that are reported to the board;
- Whether risk appetite is set for different types of risk (where risk appetite refers to “the aggregate level and types of risk a firm is willing to assume in its exposures and business activities in order to achieve its business objectives” (FSB, 2013): this variable indicates whether the risk tolerance and follow-up differ for different types of risks (liquidity, operational, reputational,...);
- Whether the board is responsible for setting the risk management framework;
- Whether the board is responsible for setting the risk appetite.

3.2.4. Corporate governance variables

We investigate three aspects of corporate governance: the presence of powerful owners, state control, and board independence. The *presence of powerful owners* variable measures whether there are powerful owners in the ownership structure of the company, with a threshold of at least 20% ownership, based on ownership structure details as reported in the annual report. We use the 20% threshold of ultimate ownership as in Faccio and Lang (2002). The *state control* variable indicates whether the ultimate owner is the State. The *board independence* variable refers to the percentage of independent members on the board of directors. For this latter variable, we take the percentage of independent members as it is provided in the annual report. That is, we use the company's definition of independence which may vary from one firm to another, especially given the fact that our sample includes institutions incorporated in different countries. Nevertheless, we consider that the reported independence level is a good cross-sectional proxy for board independence.

3.2.5. Country effect

As notably emphasized by Ferreira et al. (2012), country characteristics explain most of the cross-sectional variation in corporate governance characteristics. Since our sample includes financial institutions from different countries, we must account for this effect. We classify countries according to their legal tradition: common law (UK, Ireland) versus civil law (Continental Europe). We subdivide the civil law countries into three categories because of distinct differences in the local legal systems: Napoleonic civil law (Belgium, France, Luxembourg, Italy, Netherlands, Spain), German civil law (Austria, Germany, Greece, Portugal, Switzerland), and Nordic/Scandinavian civil law (Denmark, Norway, Sweden, Finland). We use a more fine-grained distinction than the typical common versus civil law classification in order to account for as much cross-sectional variation as possible. This choice is also justified by the fact that the EU15, which is the focus of this research, includes 13 civil law countries, and only two common law countries.

3.2.6. Control variables

Finally, we use a set of control variables which can be assumed to affect the risk governance practices of financial institutions.

3.2.6.1. Board size

The number of board members is included as a control variable. This inclusion allows to control for a potential effect of the size of the board on risk governance practices, for example a firm with a larger board is potentially more likely to have different board-level committees, and therefore more likely to have a risk committee.

3.2.6.2. Return on assets

Return on Assets (ROA) is used as a proxy for profitability, and controls for its effect on risk governance practices. A more profitable company may have more resources dedicated to the quality of risk governance. It should therefore be considered as a potential determinant of risk governance, and used as a control variable in our case. This variable is extracted from *Datastream*.

3.2.6.3. Volatility

Datastream's historical 1-year stock volatility is used to control for the effect of firm risk. A riskier firm may establish a risk governance structure that encourages risk-taking, as opposed to an institution with a low-risk profile. Stock volatility is used to control for firm risk, as commonly seen in the existing literature (Ellul and Yerramilli, 2013).

3.2.6.4. Leverage

Leverage is used as a proxy to control for the potential effect of the financial structure on the governance practices implemented by the firm. This variable is computed as the ratio of total debt to common equity, where both elements are extracted from *Datastream*.

3.2.6.5. *Market-to-book ratio*

The market-to-book ratio is used to control for the effect of growth potential on governance practices. It could indeed be argued that a healthy firm, with high-growth opportunities, will tend to implement stronger controls at any level, including on risk governance aspects. The variable is computed as the share price on the last day of the year divided by the book value per share for that same year.

3.2.6.6. *Annual return*

Annual return is used to control for the effect of stock performance on governance practices. For similar reasons as with the market-to-book variable, a firm with good stock performance might be more eager to settle certain governance mechanisms. This variable is computed as the ratio of the difference in share price between the last day and the first day of the year, divided by the share price on the first day of the year.

3.2.6.7. *Firm size*

The size of the financial institution may have an effect on the governance quality, we therefore include the book value of total assets as a control variable. This variable is directly extracted from the information collected in annual reports.

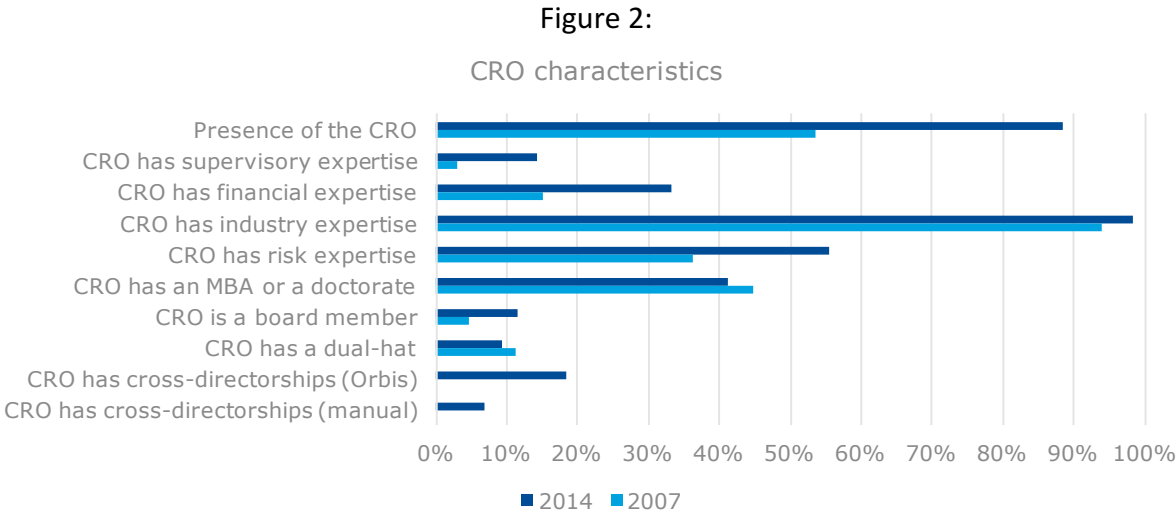
4. Results and Discussion

4.1. Descriptive statistics

4.1.1. CRO characteristics

Figure 2 summarizes the means for the variables that relate to CRO characteristics. Since each variable is a dummy, the mean corresponds to the percentage of observations for which the variable takes the value of 1. For example, 89% of our sample had a CRO in 2014 while only 53% had one in 2007. As we can observe, CRO presence and expertise also appear to be much higher in the post-crisis period. Only the mean for the variable that captures whether the CRO holds an MBA or a doctorate is slightly lower after the crisis (45% in 2007 versus 41% in 2014), but the difference is relatively low and does not allow us to conclude that CRO expertise

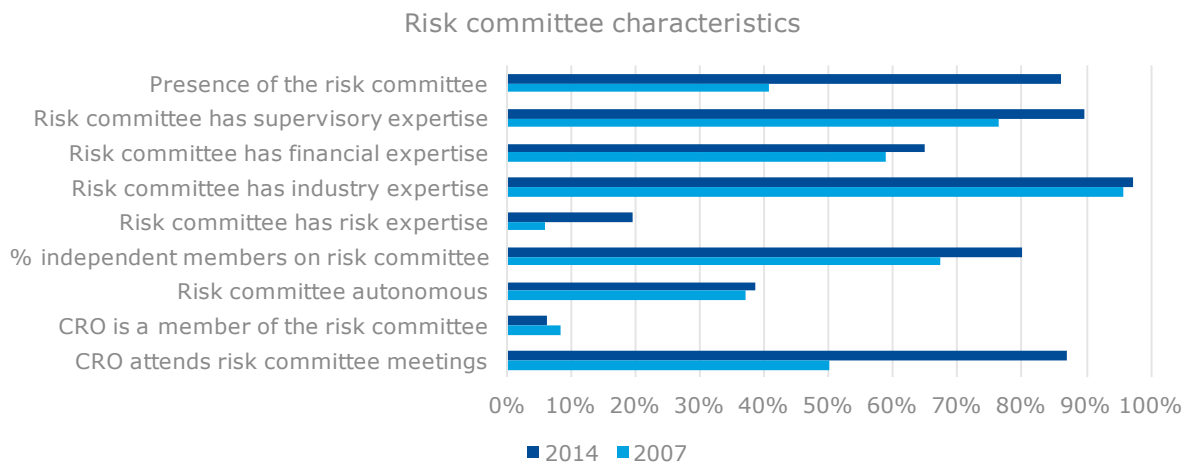
significantly declined after the crisis. The CRO is a board member for only a limited fraction of our sample (5% in 2007, 11% in 2014), but the mean has doubled in the post-crisis period.



4.1.2. Risk committee characteristics

Figure 3 provides an overview of the mean values for risk-committee variables. Again, risk committee presence and expertise appear to have significantly increased in the post-crisis period. The percentage of independent board members on the risk committee also increased from 67% to 80% in the post-crisis period. The autonomy of the risk committee (in the sense of not being merged with another committee) does not seem to have evolved significantly with the crisis and remains below 50%. No major change is observed either for the variable measuring whether the CRO is part of the risk committee. However, the data show that the CRO attends risk committee meetings in a much higher proportion of cases in the post-crisis period (50% in 2007 versus 87% in 2014).

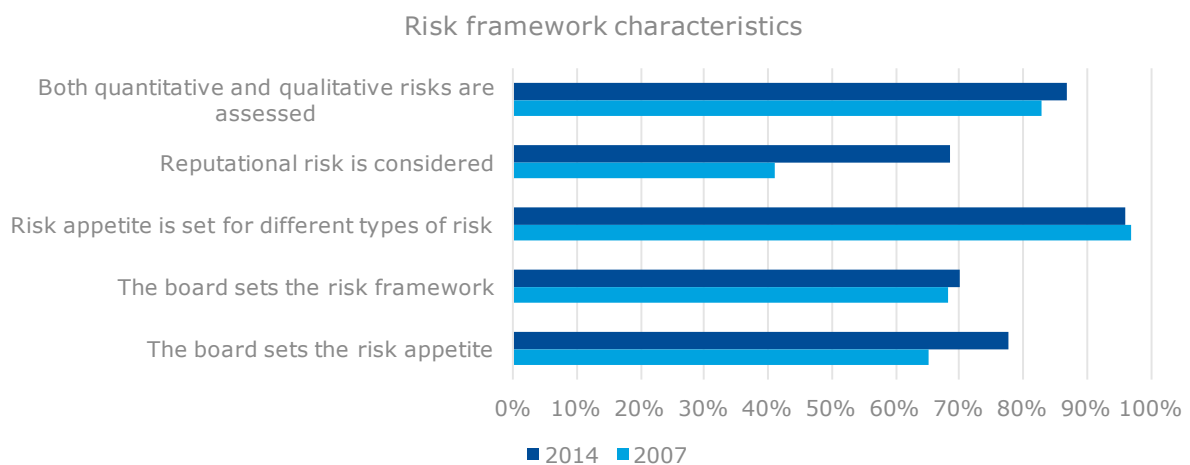
Figure 3:



4.1.3. Risk management characteristics

Figure 4 describes the mean values of the indicators assessing the risk management framework of the firms in our sample. Interestingly, only two variables seem to have significantly increased in the post-crisis era: whether reputational risk is considered by the board (41% in 2007, 69% in 2014), and whether the board is responsible for setting the risk appetite (65% in 2007, 78% in 2014).

Figure 4:



4.2. Comparing banks and insurance companies

Table 2 gives a summary of the variables for which a significant difference is observed between banks and insurance companies. The level of significance is defined based on a t-test for difference in means, and only differences below the 10% level of significance are reported.

Table 2. Significant differences between banks and insurance companies in year 2014

Variables	Mean for banks	Mean for insurance companies	Difference
Presence of the CRO	96%	76%	+
CRO expertise (aggregated)	81%	64%	+
Presence of the risk committee	96%	70%	+
Both quantitative and qualitative risks are assessed	81%	100%	-
Reputational risk is considered	74%	59%	+
The board sets the risk framework	77%	60%	+
The board sets the risk appetite	88%	56%	+

As we can see in Table 2, overall banks appear to have stricter risk governance practices than insurance companies. Out of 7 significant differences between the two groups of companies, 6 are in favor of banks. Banks tend to score substantially higher on CRO and risk committee presence, CRO expertise, consideration for reputational risk, and responsibility of the board in setting the risk framework and the risk appetite. In contrast, insurance companies appear to consider both quantitative and qualitative risks to a greater extent than banks. However, this latter result has to be handled with caution for two reasons: first, the variable contains many missing observations (52% missing values for insurance companies); second, a missing value was assigned during the data collection when nothing is mentioned about risk assessment in the publicly available documents such that it is possible that many of the missing values actually correspond to cases where qualitative risk is not considered at all. Because of this important limitation, we cannot draw any major conclusions based on that single result.

4.3. Country effect

Table 3 presents the results for the OLS regressions where the effect of differences in the legal system on risk governance practices is investigated. Interestingly, common law countries show significant coefficients with a positive sign in the majority of cases, while Napoleonic civil law countries show significant coefficients in two regressions but with the opposite sign. Based on this we can conclude that common law systems are generally associated with more advanced risk governance practices, while Napoleonic civil law systems turn out to be less strict on two risk governance aspects, namely CRO presence and risk committee independence.

Table 3. Country effects

This table reports the results of the cross-sectional OLS regression for year 2014 specified as follows:

$$Y_i = \alpha_i + \beta_1 \cdot \text{NAPOLEONIC}_i + \beta_2 \cdot \text{GERMAN}_i + \beta_3 \cdot \text{NORDIC}_i + \gamma \cdot X_i + \varepsilon_i$$

where Y successively refers to the dependent variables listed in the first column of the table, X is a vector of control variables as listed in section 3.2.6. The “Napoleonic” variable is a dummy that indicates whether the firm operates in a Napoleonic civil law country (Belgium, France, Luxembourg, Italy, Netherlands, Spain); the “German” variable characterizes German civil law countries (Austria, Germany, Greece, Portugal, Switzerland); the “Nordic” variable sets for Scandinavian civil law countries (Denmark, Norway, Sweden, Finland); the constant captures the effect of common law countries (UK, Ireland); Poland is excluded from the list because its legal system is a mixture of French and German civil law. In the table below, each row refers to one regression where the coefficients and p-values associated with our variables of interest are reported.

Variables	Common law	Napoleonic civil law	German civil law	Nordic civil law	#obs	R ²
CRO	0.956*** (0.000)	-0.284** (0.039)	-0.165 (0.273)	-0.062 (0.747)	65	0.217
CRO expertise ⁸	2.291 (0.120)	0.816 (0.392)	0.891 (0.344)	1.174 (0.324)	35	0.347
CRO power ⁹	0.121 (0.562)	0.023 (0.886)	0.074 (0.638)	-0.277 (0.315)	41	0.221
CRO on board	0.095 (0.592)	-0.069 (0.602)	-0.0208 (0.147)	-0.151 (0.444)	50	0.159
Risk Committee presence	1.050*** (0.000)	-0.095 (0.412)	-0.199 (0.123)	-0.269 (0.102)	65	0.433
RC strength ¹⁰	2.623*** (0.000)	-0.098 (0.816)	0.652 (0.163)	-0.677 (0.371)	49	0.222
RC independence	1.031*** (0.000)	-0.265** (0.047)	-0.059 (0.696)	0.004 (.987)	44	0.188
CRO in RC	1.384*** (0.002)	-0.160 (0.599)	-0.396 (0.257)	0.293 (0.557)	29	0.436
Risk strength	4.786*** (0.000)	-0.304 (0.605)	0.307 (0.638)	-0.703 (0.379)	27	0.516

4.4. The effect of corporate governance characteristics on risk governance

In order to better understand what determines risk governance practices of financial institutions in Europe, we investigate the effect of the presence of powerful owners, the presence of the State in the ownership structure of the firm, and board independence on risk governance indicators.

We use OLS regressions with the following specification:

$$Y_{i,t} = \alpha_{i,t-1} + \beta_1 \cdot \text{POWERFUL OWNERS}_{i,t-1} + \beta_2 \cdot \text{STATE CONTROL}_{i,t-1} + \beta_3 \cdot \text{BOARD INDEPENDENCE}_{i,t-1} + \gamma \cdot X_{i,t-1} + \delta \cdot \text{YEAR}_{i,t-1} + \varepsilon_{i,t-1}$$

where Y_i successively refers to the list of variables capturing risk governance practices, X_i is a vector of control variables. Results are reported in Table 4.

In order to control for potential endogeneity concerns in the relationship between corporate governance (ownership structure and board characteristics) on risk governance practices, we use lagged independent variables in all regressions. It is indeed important to control for this

⁸ The CRO expertise variable is the sum of all expertise variables (MBA/doctorate, financial, industry, risk and supervisory expertise).

⁹ The CRO power variable is the sum of the dual-hatting and the cross-directorship variables

¹⁰ The Risk committee strength variable is the sum of the Autonomous risk committee and all risk committee expertise variables

effect since the relationship between our dependent and independent variables may operate in both directions: the way in which financial institutions structure their risk governance potentially also has an impact on ownership structure and board composition.

4.4.1. Powerful owners

As we can see in Table 4, the presence of powerful owners (i.e., ultimate owners with more than 20% ownership) has a significant positive effect on the risk committee presence, risk committee independence and on the board being responsible for setting the risk framework. In contrast, it has a negative and significant effect on the presence of a CRO, CRO having financial and risk expertise, the assessment of both quantitative and qualitative risks, and attention being paid to reputational risk. These results can be interpreted as financial institutions with powerful owners giving more power to the board and setting up weaker risk controls, consistent with the idea that boards have less power when firm ownership is diluted.

4.4.2. State control

Table 4 shows that State control has a positive and significant effect on the industry expertise of the CRO and the autonomy of the risk committee. It has a significant negative effect on the CRO financial expertise and the supervisory expertise of the risk committee. The latter observation seems to be in line with earlier findings that a lack of board financial competence in state-owned banks correlates strongly with losses incurred during the financial crisis (Hau & Thum, 2009).

4.4.3. Board independence

Finally, we can observe in Table 4 that the independence of the board has a significant positive effect on CRO expertise, the independence and the supervisory expertise of the risk committee, while it is associated with less autonomy of the risk committee and less responsibility of the board to set up the risk framework.

5. Conclusion

The objective of this paper is to examine the relationship between the corporate governance structure and the risk management practices of banks and insurance companies across Europe before and after the financial crisis. The literature advocates a strong and independent risk management function (Ellul & Yerramilli, 2013; Stulz, 2016; Mongiardino and Plath, 2010). It is unclear, however, what determines the strength of the risk management function within a firm. While there is an extensive empirical literature on corporate governance, significant gaps exist in our understanding of the risk governance practices of financial institutions and how they are impacted by the company's governance structure. Our analysis suggests that risk governance is primarily determined by four factors: country-specific legal tradition, ultimate ownership, state control and board independence. However, further analysis is needed to gain an in-depth understanding of the "what" and "why" of the risk governance practices employed at financial institutions across the EU.

Table 4. The effect of ownership structure and board independence on risk governance

Robust standard errors are reported in parentheses. Firm and year fixed effects are included, as well as clustered standard errors at the firm level. All dependent variables are lagged 1 year.

Panel A: CRO variables

VARIABLES	(1) CRO presence	(2) Supervisory expertise	(3) Financial expertise	(4) Industry expertise	(5) Risk expertise	(6) CRO on board
Powerful owners	-0.304** (0.121)	-0.0231 (0.0887)	-0.559** (0.259)	0.0256 (0.132)	-1.695*** (0.361)	-0.128 (0.152)
State control	-0.145 (0.649)	-2.149 (1.611)	-4.884** (2.223)	6.380** (2.453)	0.372 (4.146)	0.248 (0.343)
Board independence	0.00615 (0.677)	2.680*** (0.453)	4.055*** (0.475)	-0.395 (0.730)	1.853** (0.897)	1.156 (0.790)
Board size	-0.0396 (0.0331)	0.0111 (0.0330)	-0.0926 (0.0728)	0.132** (0.0504)	0.0218 (0.108)	-0.0468 (0.0288)
ROA	-0.0536 (0.0844)	-0.177** (0.0847)	-0.484** (0.207)	-0.0210 (0.141)	-0.987*** (0.265)	-0.204** (0.0979)
Volatility	0.962 (0.919)	2.825 (1.896)	4.716* (2.400)	-7.531** (2.886)	2.362 (4.725)	0.0935 (0.520)
Leverage	-0.0167 (0.0247)	0.0886*** (0.0244)	0.215*** (0.0395)	-0.0733* (0.0383)	0.139** (0.0634)	0.0181 (0.0222)
Market-to-book	0.256** (0.114)	-0.122* (0.0720)	-0.736*** (0.204)	-0.253** (0.111)	-0.205 (0.278)	-0.0441 (0.109)
Annual return	0.706** (0.341)	0.659 (0.451)	-1.436* (0.783)	1.611** (0.672)	1.324 (1.337)	0.612** (0.276)
Total assets	0.746 (0.728)	-1.21*** (0.127)	-3.21*** (0.209)	-0.280 (0.199)	1.21*** (0.332)	0.201 (0.285)
Year 2014	0.398*** (0.128)	0.113 (0.115)	-0.0345 (0.327)	-0.286 (0.172)	0.179 (0.457)	-0.0365 (0.101)
Constant	0.0816 (0.808)	-2.176*** (0.288)	0.744** (0.338)	1.527*** (0.482)	-2.171*** (0.515)	-0.215 (0.491)
Observations	91	58	58	58	58	64
R-squared	0.574	0.946	0.930	0.751	0.829	0.781
Number of FIRM_ID	59	45	45	45	45	47

Panel B: Risk committee variables¹¹

VARIABLES	(1) Risk committee presence	(2) Autonomy	(3) Supervisory expertise	(4) Financial expertise	(5) Risk expertise	(6) Audit committee merged	(7) Independe nce
Powerful owners	0.573*** (0.122)	-0.389 (0.392)	0.0448 (0.167)	-0.299 (0.378)	0.0469 (0.0901)	0.267 (0.191)	1.936** (0.883)
State control	-0.665 (0.511)	1.922* (1.038)	-1.002*** (0.310)	0.760 (0.663)	-0.163 (0.335)	-0.528 (0.483)	-3.367 (2.014)
Board independence	0.0312 (0.818)	-2.663* (1.433)	1.861*** (0.378)	-0.204 (1.082)	0.157 (0.345)	0.532 (0.624)	2.078 (2.403)
Board size	-0.00784 (0.0320)	-0.0220 (0.0670)	-0.0445** (0.0196)	-0.0167 (0.0339)	0.0275 (0.0290)	-0.0363 (0.0326)	-0.0166 (0.0479)
ROA	-0.190** (0.0798)	-0.0870 (0.315)	-0.285*** (0.0631)	-0.131 (0.126)	0.0119 (0.0578)	-0.289* (0.154)	-1.191** (0.519)
Volatility	0.399 (0.790)	-1.724 (1.868)	1.084 (0.832)	-0.616 (1.959)	0.372 (1.668)	1.042 (0.863)	2.315* (1.296)
Leverage	-0.0124 (0.0300)	-0.0831* (0.0419)	0.0486*** (0.0156)	-0.0457 (0.0335)	-0.0369 (0.0367)	-0.0148 (0.0165)	0.153 (0.102)
Market-to-book	0.0991 (0.142)	-0.0135 (0.270)	0.00993 (0.0992)	0.161 (0.170)	0.109 (0.133)	0.115 (0.123)	-0.474 (0.470)
Annual return	0.681* (0.344)	-0.196 (0.779)	0.418* (0.228)	0.553 (0.560)	-0.174 (0.228)	0.657* (0.373)	2.001* (1.107)
Total assets	-0.695 (0.602)	-0.298 (0.776)	0.231 (0.322)	-0.966* (0.551)	-0.119 (0.562)	-0.745* (0.400)	-0.863*** (0.275)
Year 2014	0.353** (0.167)	-0.286 (0.224)	-0.00782 (0.104)	0.144 (0.224)	0.210 (0.156)	-0.103 (0.0965)	-0.151 (0.348)
Constant	0.437 (0.981)	3.703 (2.228)	-0.122 (0.470)	1.404 (0.876)	-0.487 (0.946)	0.202 (1.059)	-0.672 (1.065)
Observations	91	64	87	87	87	64	59
R-squared	0.588	0.702	0.698	0.286	0.286	0.706	0.787
Number of FIRM_ID	59	49	57	57	57	49	46

¹¹ We do not report the results for the regression with Risk committee industry expertise as the dependent variable because we have no variation in this variable (either always equal to 1 or missing)

Panel C: Risk-related variables

VARIABLES	(1) Both quantitative and qualitative risks assessed	(2) Reputational risk assessed	(3) Risk appetite for different risks	(4) Risk framework by the board ¹²	(5) Risk appetite by the board
Powerful owners	-1.272*** (0.140)	-0.269* (0.147)	0.0220 (0.0773)	1.899** (0.916)	0.318 (0.698)
State control	0.793 (0.480)	0.339 (0.529)	0.287 (0.248)		-1.326 (1.035)
Board independence	3.451** (1.601)	-0.480 (0.792)	-0.152 (0.292)	-7.687*** (2.140)	-0.692 (1.078)
Board size	-0.163*** (0.0335)	-0.0548 (0.0393)	0.0365 (0.0250)	-0.343*** (0.0614)	-0.0400 (0.0655)
ROA	0.466* (0.248)	0.185** (0.0820)	0.0596 (0.0532)	0.569*** (0.162)	-0.0535 (0.257)
Volatility	-1.470** (0.603)	0.376 (0.889)	-0.517 (0.403)	-19.69*** (5.938)	1.721 (1.792)
Leverage	0.158*** (0.0381)	0.00204 (0.0411)	-0.00487 (0.00957)	0.244*** (0.0633)	0.0547 (0.0405)
Market-to-book	-2.130*** (0.165)	0.0941 (0.110)	-0.0245 (0.0477)	-1.257** (0.470)	-0.142 (0.233)
Annual return	-0.642*** (0.212)	-0.879** (0.363)	-0.187 (0.158)	2.272*** (0.472)	-0.615 (0.713)
Total assets	-1.23*** (0.405)	-1.16* (0.606)	0.153 (0.213)	-1.82 (1.56)	2.50** (1.07)
Year 2014	-1.287*** (0.170)	0.566*** (0.132)	-0.0317 (0.0429)	0.0979 (0.147)	0.0199 (0.334)
Constant	5.323*** (1.386)	1.676* (0.946)	0.725** (0.324)	16.09*** (4.321)	0.368 (1.896)
Observations	62	91	78	55	73
R-squared	0.859	0.519	0.420	0.904	0.552
Number of FIRM_ID	46	59	53	44	53

¹² The State control variable is omitted in column 4 because of a lack of variability

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Appendix 1: List of variables

Variable	Measurement
<i>CRO variables</i>	
Presence of a CRO	Whether the firm has a CRO or equivalent
CRO expertise	
MBA	CRO has an MBA or a doctorate
Financial experience	CRO has financial experience
Risk expertise	CRO has risk expertise
Industry experience	Years of banking/insurance experience above median
Supervisory expertise	Years in senior level managerial position above median
CRO power	
Dual hat	Dual-hatting
Cross-directorship	CRO has cross-directorships (only for the post-crisis period) (Orbis)
CRO on board	CRO is a board member
<i>Risk committee variables</i>	
RC presence	Presence of a risk committee
RC expertise	
Supervisory expertise	Risk committee has supervisory expertise
Financial experience	Risk committee has financial experience
Industry experience	Risk committee has industry expertise
Risk expertise	Risk committee has risk expertise
RC independence	
Independent RC members	% of independent members on the RC
RC autonomy	Whether the risk committee is merged with another committee
CRO in RC	Whether the CRO is part of the risk committee
CRO attends RC meetings	Whether the CRO attends risk committee meetings
<i>Risk framework variables</i>	
Quantitative & qualitative risks	Whether both quantitative and qualitative risks are assessed by the board
Reputational risk	Whether reputational risk is specified in the list of risks that are reported to the board
Risk appetite for different risks	Risk appetite assessed for different types of risk
Risk framework by the board	Whether the board is responsible for setting the risk management framework
Risk appetite by the board	Whether the board is responsible for setting the risk appetite

Corporate governance variables

Powerful owners	Presence of powerful owners
State control	State is ultimate owner
Board independence	Percentage of independent members in the board of directors

Control variables

Board size	Number of board members
ROA	Profitability – ROA (Datastream)
Volatility	Historical 1 year volatility (Datastream)
Leverage	Debt / Equity (Datastream)
Market-to-book	Market-to-book ratio (Market to book ratio (share price on the last day of the year divided by the book value per share for that year)
Annual return	Annual return: Share price last day- share price first day)/share price first day
Firm size	Book value of total assets

Appendix 2: List of banks included in the sample

	COUNTRY	NAME
1	AUSTRIA	Erste Group Bank AG
2	AUSTRIA	Raiffeisen Zentralbank Oesterreich AG
3	AUSTRIA	BAWAG P.S.K. AG
4	BELGIUM	KBC Bank NV
5	BELGIUM	Belfius
6	BELGIUM	Dexia SA
7	DENMARK	Danske Bank A/S
8	DENMARK	Nykredit Holding A/S
9	DENMARK	Jyske Bank A/S
10	DENMARK	Sydbank A/S
11	FRANCE	BNP Paribas
12	FRANCE	Société Générale SA
13	FRANCE	Crédit Agricole SA
14	FRANCE	La Banque Postale
15	FRANCE	Fédération du Crédit Mutuel
16	GERMANY	Deutsche Bank AG
17	GERMANY	Commerzbank AG
18	GERMANY	DZ Bank AG
19	GERMANY	Deutsche Postbank AG
20	GREECE	National Bank of Greece SA
21	GREECE	Piraeus Bank SA
22	GREECE	Alpha Bank AE
23	IRELAND	Permanent TSB Plc
24	IRELAND	Bank of Ireland
25	IRELAND	Allied Irish Banks plc
26	ITALY	Banca Monte dei Paschi di Siena SpA
27	ITALY	UniCredit SpA
28	ITALY	Mediobanca SpA
29	ITALY	Banco BPI SA
30	ITALY	Banca popolare dell'Emilia Romagna
31	NETHERLANDS	ING Groep NV
32	NETHERLANDS	Coöperatieve Rabobank
33	NETHERLANDS	SNS Reaal NV
34	NORWAY	DNB Group
35	PORTUGAL	Banco Comercial Português, SA-Millennium bcp
36	PORTUGAL	Caixa Geral de Depositos
37	SPAIN	Banco Santander SA
38	SPAIN	Banco Bilbao Vizcaya Argentaria SA
39	SPAIN	Banco de Sabadell SA
40	SPAIN	Banco Popular Espanol SA
41	SWEDEN	Svenska Handelsbanken
42	SWEDEN	Skandinaviska Enskilda Banken AB

43	SWEDEN	Swedbank AB
44	SWEDEN	Nordea Bank AB (publ)
45	SWEDEN	Länsförsäkringar AB
46	SWITZERLAND	UBS
47	SWITZERLAND	Credit Suisse
48	SWITZERLAND	Raiffeisen Schweiz
49	SWITZERLAND	Zurich Cantonal Bank
50	UNITED KINGDOM	Barclays Plc
51	UNITED KINGDOM	HSBC Holdings PLC
52	UNITED KINGDOM	Lloyds Banking Group Plc
53	UNITED KINGDOM	Royal Bank of Scotland Group Plc
54	UNITED KINGDOM	Standard Chartered plc

Appendix 3: List of insurance companies included in the sample

	COUNTRY	NAME
1	AUSTRIA	Uniqa
2	AUSTRIA	Vienna
3	BELGIUM	Belfius Insurance
4	BELGIUM	Ageas
5	DENMARK	Topdanmark
6	DENMARK	Tryg
7	FINLAND	Sampo Group
8	FRANCE	AXA
9	FRANCE	Groupama
10	FRANCE	SCOR SE
11	GERMANY	Allianz
12	GERMANY	Hannover Re
13	GERMANY	Munich Re
14	GERMANY	Ergo
15	IRELAND	XL Group
16	ITALY	Generali
17	ITALY	Mediolanum
18	NETHERLANDS	Aegon
19	NETHERLANDS	Achmea
20	NETHERLANDS	Delta Lloyd
21	NORWAY	Gjensidige Forsikring
22	POLAND	PZU
23	SPAIN	Mapfre
24	SWITZERLAND	Zurich Insurance
25	SWITZERLAND	Swiss Re
26	SWITZERLAND	Swiss Life
27	SWITZERLAND	Baloise
28	SWITZERLAND	Helvetia Holding
29	UNITED KINGDOM	Aviva
30	UNITED KINGDOM	Legal & General
31	UNITED KINGDOM	Old Mutual
32	UNITED KINGDOM	Prudential plc
33	UNITED KINGDOM	RSA